

FIGURE 1

FIGURE 2a. Primers used to obtain sequences high-fidelity PCR amplification of human cDNA.

5 RAPF: GCGATAGGATCCTACTCGCGGGAGAAGAACCAAGCCAGCCGTCCCCGA
RAPR: GCGATAAACCGGTTCTGCCTCGCGCGAGCTCTGGAGATCCTGCCGGACAGGTCT

GAAF: GCGATAACCGGTGCACACCCCGGCCGTCCCAGAGCAGTG
GAAR: GCGATAACTCGAGTCAACACCCAGCTGACGAGAAACTGC

10 IDUF: GCGATAACCGGTGAGGCCCGCACCTGGTGCATGTGGACGCCGC
IDUR: GCGATAACTCGAGTCATGGATTGCCGGGATGGGGGCCCTTGG

GDNF: ACAGTGACCGGTTACCAAGATAAACAAATGGCA
15 GDNR: ACAGTGCTCGAGTCTAGATCAGATACATCCACACCTTT

FIGURE 2b. GDNF fusion, substitution of RAPF with RAPBACF in RAP amplification of GDNF construct.

RAPBACF: ACAGTGGCCATGGGGGTTCTTACTCGCGGGAGAAGAACCAAGCCG
20

FIGURE 3. Nucleotide and protein sequences of the RAP-GAA fusion

cttaccgcccattgcgggggtccgagcggggctctgtggctgtccctggctctgcgcaccgtg
 M R G P S G A L W L L L A L R T V
 5 ctcggatcctactcgcgggagaagaagaaccagccaaagccgtcccgaaacgcgagtcggaa
 L G S Y S R E K N Q P K P S P K R E S G
 gaggagttccgcatggagaagttaaccagctgtggagaaggcccagcactgcacatctt
 E E F R M E K L N Q L W E K A Q R L H L
 10 cctcccgtagggctggccgagctccacgcgtatctgaagatacaggagagggacgaactc
 P P V R L A E L H A D L K I Q E R D E L
 gccttggaaagaaactaaagcttgcggcttggacgaagatgggagaaggaagcgagactc
 A W K K L K L D G L D E D G E K E A R L
 atacgcacactcaatgtcatcttggccaagtatggcttggacggaaagaaggacgctcg
 I R N L N V I L A K Y G L D G K K D A R
 15 caggtgaccaggcaactccctcagtggcacccaggaagacgggtggatgacccaggctg
 Q V T S N S L S G T Q E D G L D D P R L
 gaaaagctgtggcacaaggcgaagaccttggaaattctccggcgaagaactggacaag
 E K L W H K A K T S G K F S G E E L D K
 20 ctctggggaggttcctgcatacataagagaaagttcacgtacaacgttgcgtggag
 L W R E F L H H K E K V H E Y N V L L E
 accctgaggcaggaccgaagaaatccacgagaacgtcattagccctcgacgtgac
 T L S R T E E I H E N V I S P S D L S D
 atcaagggcagcgttgcacagcaggcacacggagctgaaggagaagctgcgcagcatc
 I K G S V L H S R H T E L K E K L R S I
 25 aaccagggcctggaccgcctgcgcagggtcagccaccaggctacagcactggctgag
 N Q G L D R L R V S H Q G Y S T E A E
 ttgcaggagccagggtgattgacctgtgggacctggcgcagttccgcacccatcaggac
 F E E P R V I D L W D L A Q S A N L T D
 aaggagctggaggcgttccggaggagctcaagcacttgcagccaaatcgagaagcac
 K E L E A F R E E L K H F E A K I E K H
 30 aaccactaccagaagcagctggagattgcgcacgagaagctgaggcacgcagagac
 N H Y Q K Q L E I A H E K L R H A E S V
 ggcgcacggcgagcgttgagccgcagccgcagaagcagccctgtggagggcggacc
 G D G E R V S R S R E K H A L L E G R T
 35 aaggagctgggtctacacggtaagaagcatctgcaggacgttccggcaggatctcc
 K E L G Y T V K K H L Q D L S G R I S R
 gctcgcgcgaggcagaaaccgggtcacaccccgccgtcccagagcagtgcacac
 A R A E A E T G A H P G R P R A V P T Q
 40 tgcgacgtccccccaaacagccgcttcgattgcgcctgtacaaggccatcaccc
 C D V P P N S R F D C A P D K A I T Q E
 cagtgcgaggcccgccggctgtctacatccctgcacaaaggccatcaccc
 Q C E A R G C C Y I P A K Q G L Q G A Q
 atggggcagccctggcttccaccagctacccagctacaagctggagaacctg
 M G Q P W C F F P P S Y P S Y K L E N L
 45 agctccctgtaaatggctacacggccaccctgaccgttaccaccc
 S S S E M G Y T A T L T R T T P T F F P
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 K D I L T L R L D V M M E T E N R L H F
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 T I K D P A N R R Y E V P L E T P R V H
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 S R A P S P L Y S V E F S E E P F G V I
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 50 acggaccagttccctcagctgtccaccctgcgtccctcg
 A D Q F L Q L S T S L P S Q Y I T G L A
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 E H L S P L M L S T S W T R I T L W N R
 gaccttgcgcaccc
 55 acggccgttgcgacac
 D L A P T P G A N L Y G S H P F Y L A L
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 catggatgtggc

E D G G S A H G V F L L N S N A M D V V
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5 F L G P E P K S V V Q Q Y L D V V G Y P
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A I T R Q V V E N M T R A H F P L D V Q
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W N D L D Y M D S R R D F T F N K D G F
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R D F P A M V Q E L H Q G G R R Y M M I
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15 V D P A I S S S G P A G S Y R P Y D E E G
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L R R G V F I T N E T G Q P L I G K V W
cccggttccactgcctcccccacttcaccaacccacagccctggctggggag
P G S T A F P D F T N P T A L A W W E D
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M V A E F H D Q V P F D G L W I D M N E
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P S N F I R G S E D G C P N N E L E N P
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25 P Y V P G V V G G T L Q A A T I C A S S
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H Q F L S T H Y N L H N L Y G L T E A I
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T F A G H G R Y A G H W T G D V W S S W
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E Q L A S S V P E I L Q F N L L G V P L
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R Y A L L P H L Y T L F H Q A H V A G E
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T V A R P L F L E F P K D S S T W T V D
caccagctctgtggggggaggccctgctcatccccactgtcgtccaggccggaaaggcc
45 H Q L L W G E A L L I T P V L Q A G K A
gaagtgaactggctacttcccttggcacatggtagcggactgtggacgggtggcaatagag
E V T G Y F P L G T W Y D L Q T V P I E
gcccttggcagcctccacccacccatgcagctcccgctgagccagccatccacagcgag
A L G S L P P P A A P R E P A I H S E
50 gggcagttgggtgacgcgtgcggcccccctggacaccatcaacgtccacccctgg
G Q W V T L P A P L D T I N V H L R A G
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Y I I P L Q G P G L T T T E S R Q Q P M
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aataacacatcgtaatgagctgtgtacgtgtgaccagtggagggggactggccatg
60 N N T I V N E L V R V T S E G A G L Q L
cagaagggtactgtcctggcgtggccacggcccccacggccatggccatccaaacgg
Q K V T V L G V A T A P Q Q V L S N G V

cctgtctccaacttcacctacagccccgacaccaaggtcctggacatctgtgtctcgctg
P V S N F T Y S P D T K V L D I C V S L
ttgatgggagagcagttctcgtcagctggtgttactcgag
L M G E Q F L V S W C -

5

Melanotransferrin signal sequence is italicized. Linker peptide is underlined.

FIGURE 4. Nucleotide and protein sequences of the RAP-IDU fusion

aagcttaccgccatgcggggctccgagcggggctctgtggctgctcctggctcgccacc
 M R G P S G A L W L L L A L R T
 5 .gtgctcgatccactcgccggagaagaaccagcccaagccgtcccccggaaacgcgactcc
 V L G S Y S R E K N Q P K P S P K R E S
 ggagaggagttccgcattggagaagttgaaccagctgtgggagaaggcccagcgactgcatt
 G E E F R M E K L N Q L W E K A Q R L H
 cttcctcccggtaggctggccagctccacgctgatctgaagatacaggagagggacgaa
 10 L P P V R L A E L H A D L K I Q E R D E
 ctcgccttggaaagaaactaaagcttgcacggcttggacgaagatggggagaaggaaagcgaga
 L A W K K L K L D G L D E D G E K E A R
 ctcatacgcaacctcaatgtcatcttggcaagttatggctggacggaaaggacgct
 L I R N L N V I L A K Y G L D G K K D A
 15 cggcagggtgaccagcaactccctcagtggcaccaggaaagacgggctggatgacccagg
 R Q V T S N S L S G T Q E D G L D D P R
 ctggaaaagctgtggcacaaggcgaagacctctggaaatttctccggcgaagaactggac
 L E K L W H K A K T S G K F S G E E L D
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 20 K L W R E F L H H K E K V H E Y N V L L
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 E T L S R T E E I H E N V I S P S D L S
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 25 D I K G S V L H S R H T E L K E K L R S
 atcaaccaggcctggaccgcctgcgcaggcgtcagccaccaggctacagcaactgaggct
 I N Q G L D R L R R V S H Q G Y S T E A
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 D K E L E A F R E E L K H F E A K I E K
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 H N H Y Q K Q L E I A H E K L R H A E S
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 R A R A E A E T G E A P H L V H V D A A
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 R A L W P L R R F W R S T G F C P P L P
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 H S Q A D Q Y V L S W D Q Q L N L A Y V
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 45 G A V P H R G I K Q V R T H W L L E L V
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 L D L L R E N Q L L P G F E L M G S A S
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 S L A R R Y I G R Y G L A H V S K W N F
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 E T W N E P D H H D F D N V S M T M Q G
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 L G G P G D S F H T P P R S P L S W G L
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 60 L R H C H D G T N F F T G E A G V R L D

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 D E A D P L V G W S L P Q P W R A D V T
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 N G L C S P D G E W R R L G R P V F P T
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 Y R V R A L D Y W A R P G P F S D P V P
 40 tacctggagggtccctgtgccaagagggcccccattcccgggcaatccatgactcgag
 Y L E V P V P R G P P S P G N P -

Melanotransferrin signal sequence is italicized. Linker peptide is underlined.

FIGURE 5. Nucleotide and protein sequences of the RAP-GDNF fusion

atgggggttcttactcgccggagaagaaccagcccaagccgtcccgaaacgcgagtcc
 M G G S Y S R E K N Q P K P S P K R E S
 5 ggagaggagttccgcattggagaagttgaaccagctgtggagaaggcccagcgactgcat
 G E E F R M E K L N Q L W E K A Q R L H
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 L P P V R L A E L H A D L K I Q E R D E
 10 ctcgccttggaaagaaactaaagttgacggcttggacaagatgggagaagaaagcgaga
 L A W K K L K L D G L D E D G E K E A R
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 L I R N L N V I L A K Y G L D G K K D A
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 H N H Y Q K Q L E I A H E K L R H A E S
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 45 ctgggtgagtgacaaagttagggcaggcatgtgcagacccatgcctttagatgacctg
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 tcgttttagatgataacctgggttaccatattctaagaaagcattccgctaaaggtgt
 S F L D D N L V Y H I L R K H S A K R C
 50 ggatgtatctgatctgatc
 G C I -

Linker peptide is underlined.

Figure 6. Characterization of the RAP-GAA fusion.

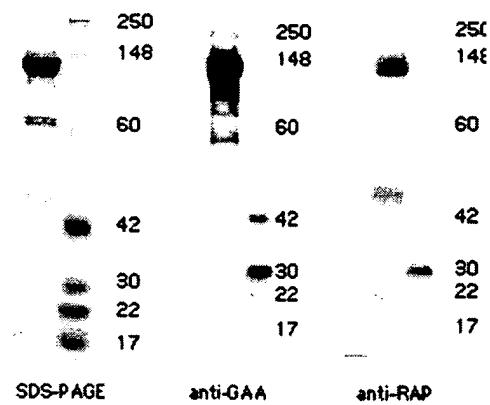


Figure 7. Assay for complex oligosaccharides on RAP-GAA

Digestion of RAP-GAA with Neuraminidase

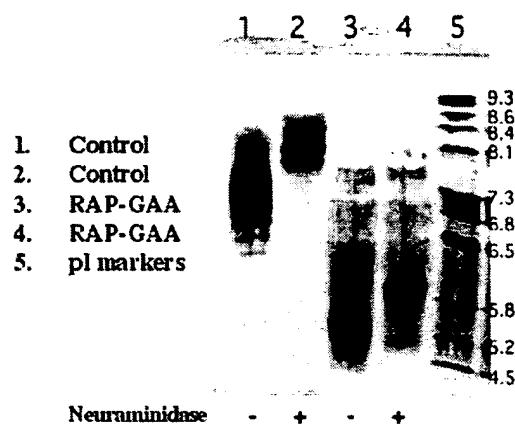


Figure 8. Assay for high-mannose oligosaccharides on RAP-GAA

Digestion of RAP-GAA with Endo H

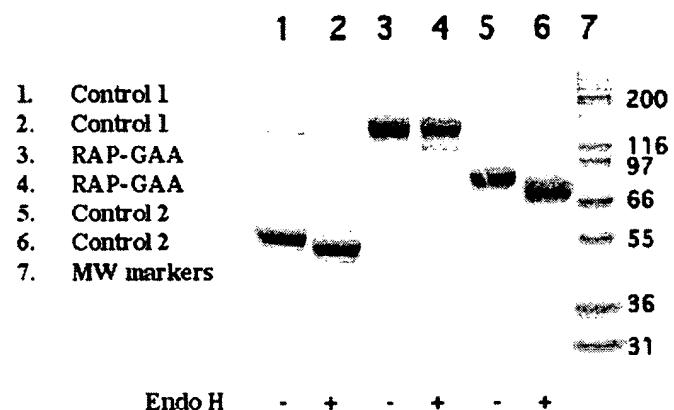
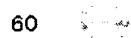
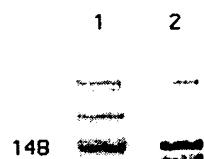


Figure 9. Characterization of RAP-IDU fusion

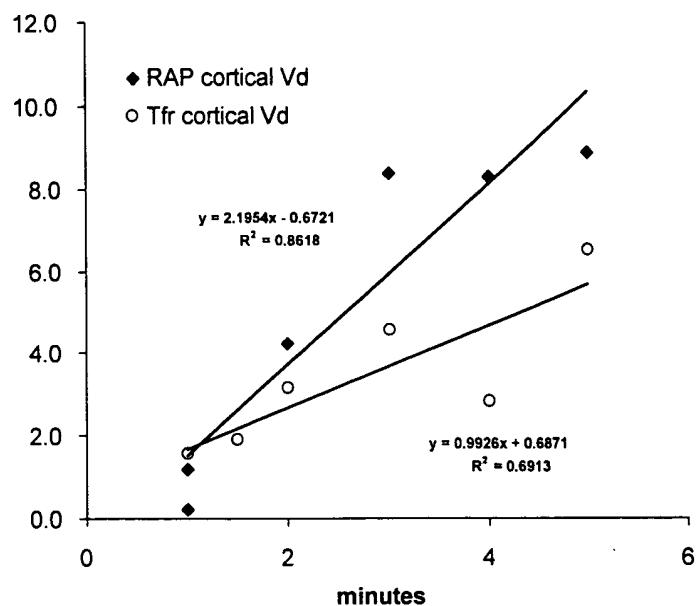


1. SDS-PAGE
2. Anti-Iduronidase Western

Binding of RAP and RAP-lysosomal enzyme fusion to LRP.

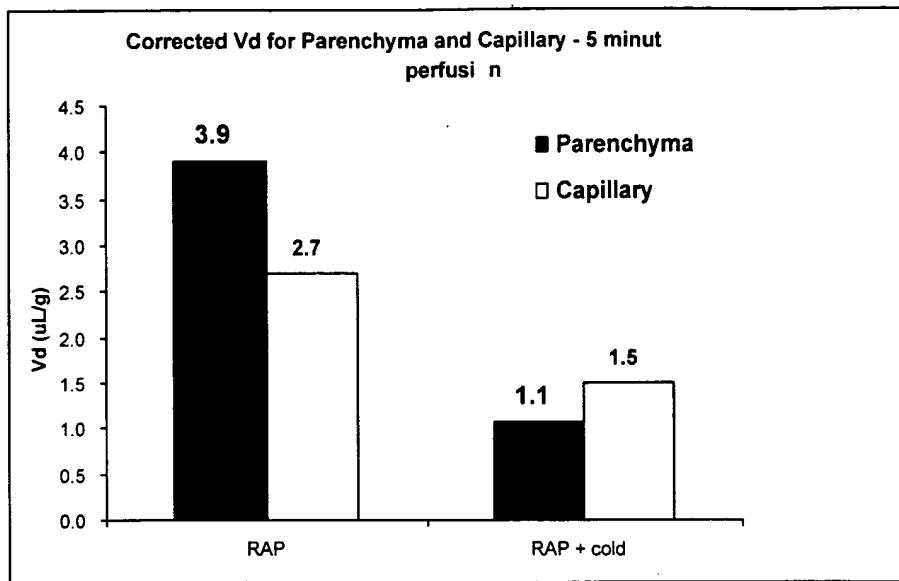
	None	RAP	RAP-Idu (Purified)	RAP-Idu (Medium)
Anti-RAP		●	■	●
Anti-Idu			●	●

FIGURE 10



Corrected V_d vs. Perfusion time.

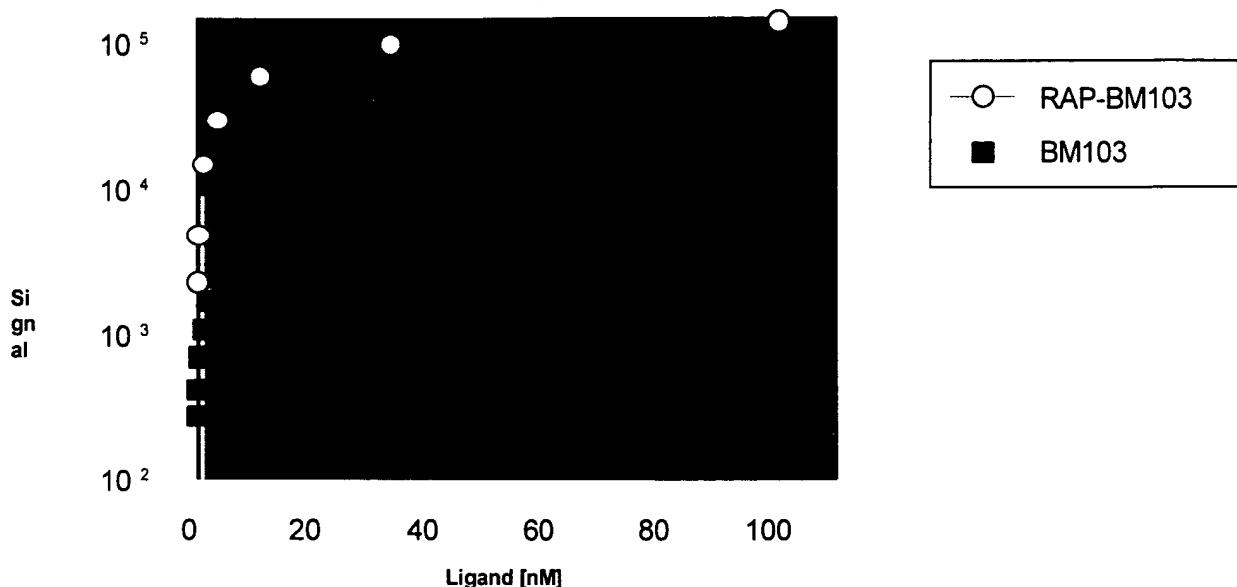
FIGURE 11.



Distribution of RAP between brain capillary endothelium and brain parenchyma.

FIGURE 12.

RAP-BM103 Uptake by Human Fibroblast
BM103 cells (GM244)



RAP-BM103

Parameter	Value	Std. Error
Vmax	160806	.4864
Km	18	.6316

BM103

Parameter	Value	Std. Error
Vmax	2691	.6376
Km	1	.6615

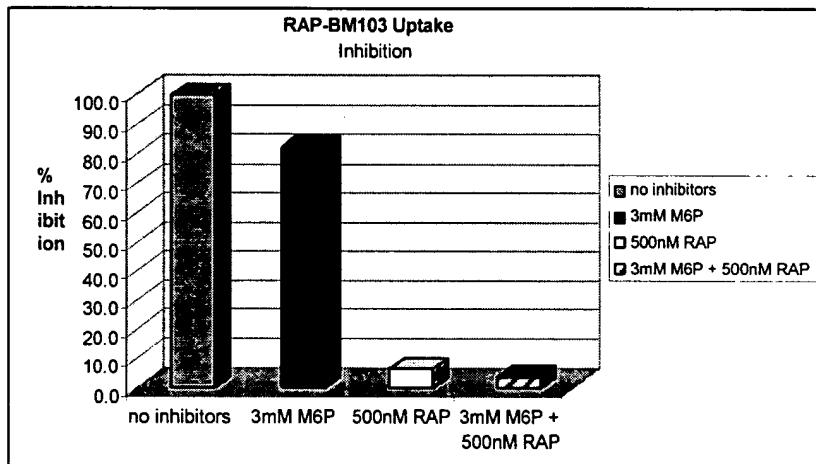


FIGURE 13

FIGURE 14. Multiple alignment of amino acid sequences of RAP from different species.

		1	-----MAPRRVRSFLRGLPA	LLILILFI	GPWPAASHGGKYSREK								
	mouse	1	MGGPTRPSPVSLLALQRKMAPRERVS	ILPRLQLLV	LEIPLMLVPQPIAGHGGKYSREK								
5	rat	1	-----LRDRVSTILPRLQLLV	LLIPLLLVPQPIAGHGGKYSREK									
	chicken	1	-----	-----MGATRT	VAVMAAFLAVSTRASKYTRFA								
	zebrafish	1	-----	-----	-MAGKYSREK								
	fruit fly	1	-----MVRSAVVAAIA	SVIIA	IAQGVDAKKQSKYKYSREK								
10	mosquito	1	-----ELCPIARRKRGIKH	ILTMPLFTR	CVIVFTWLVCNHVVQSEKAHSKY								
	flatworm	1	-----	-----	-MRNHE								
	consensus	1	-----	t	1 11 lml								
					hggkysre								
15	human	40	-----QPKPSPKRESGE	EFRMEKLNCI	WEKAQRLHILPPVRLAELHADLKIQERDE								
	mouse	61	-----NEPEMAAKRESGE	EFRMEKLNCI	WEKAQRLHLSPPVRLAELHSDLKIQERDE								
	rat	40	-----NEPEMAAKRESGE	EFRMEKLNCI	WEKAQRLHLSPPVRLAELHSDLKIQERDE								
	chicken	29	-----NEGLADAKPREAGE	FRVVRLNQVWEKAQRLQLSA	WVLAELHSDLKIQEKDE								
	zebrafish	10	-----NEKNASDKSNNOVE	FRIAKLNQVWEKAIRMQI	APVRLSELHSDLKIQEKDE								
20	fruit fly	37	-----NDPHFQQVKQ	DKYDPDFKSIQRPFRMAKLN	LWAKAQNR-LTEPKLKSLYME								
	mosquito	48	-----SKHANALPDS	TYEPDFENIQRPF	FRMAKLNLVWTKAQRH-LTEPKLKSLYTEL								
	flatworm	10	-----FLLVIGSAHNKKQT	YSTERL	FIYEKALQHVTDRQNLARIEKEI								
	consensus	61	-----ne	kr	g efRmeklNqvweKAqrl								
					lspvrlLaeLhsdLkiqekde								
25	human	91	-----IAWKKLKDGLDE	DGEKEAER	IIRNLNVILAKYGLDGKKDARQWTSN-----SLSGTQE-----								
	mouse	112	LNWKKLKV	EGLDKOGEKEAKLII	HNLNVILARYGLDGRKDAQMVSNS-----ALNEDTQ-----								
	rat	91	LNWKKLKV	EGLDG	EGEKEAKIVH	HNLNVILARYGLDGRKDTQTVHSN-----ALNEDTQ-----							
	chicken	80	LSWKKLKAEGI	GEDEKEAKLRRN	ITVIMTKYGMNKKDSHLTDIN-----YIKDGTE-----								
	zebrafish	61	QWKKLKAEGM	EDGE	REAKLRRN	ELI	AKYGMGDKKUTRTLDNSR-----LKDHEVKIG-----						
30	fruit fly	96	IA	QNLNSCHK	KKDLNADE	LRKLI	IGIMSSYDLLEHFDTQDTEKLKYKFKHDAE						
	mosquito	107	TYWQLN	EEK	KKLKEAE	ELNK	VSIMSTYIGILEHFDTQDPEKYKLA						
	flatworm	61	IASNSN	QGTQGTKEID	DDK	IGKII	KEYGL	KEVAFKEKYKHNLFQQTEDDN					
	consensus	121	l wKk lk	egld	d g ekeaklrrnlnvIlak	Ygldgk	dd	v sn	l e e				
35	human	144	-----GLDDPRLEKLW	HRAKTS	GKFSGEELDKLWREFL	HHKEKVHEYNVLLLETLS-----							
	mouse	165	-----DELGDP	PRLEKLW	HRAKTS	GKFSEELDKLWREFL	HYKEKIQEYNVLLLETLS-----						
	rat	144	-----DELGDP	PRLEKLW	HRAKTS	GKFSEELDKLWREFL	HYKEKIREYNVLLLETLS-----						
	chicken	134	-----TLD	DPRLW	SKAKTSGKF	SEELDKLWREFL	HHKEKIREYNVLLLETLS-----						
40	zebrafish	117	-----LTFDD	DE	DKLWNKARTSGKF	SEELQTLHREFQHHDKI	HEYNTIVMDT-----						
	fruit fly	155	-----HRNKS	LFKK	KKLN	SLWEKAEI	IG-FTAEL	LSI	QKEDHHQD	VDVYYSILENIG-----			
	mosquito	165	-----TYKNK	SLFKKK	LNKLW	DKAESA	FTKEEL	DAI	REEDHIIQAKI	VDVYYSILERI	GDDDD		
	flatworm	118	-----LPSGKFT	QNLQ	KLW	SOAONGK	ENQKE	LN	ALHG	ELKEVEQ	MRVYEDQ		
45	consensus	181	d	DprLekLW	kAkts	gkFs	eELdkLwrEf	hhke	Kihe	Ynv	lletls		
50	human	195	-----STEIIHEN	V	SPSDMS	-----	DKGSV	IHS	E	TEL	KEKL		
	mouse	216	-----PAEEGYEN	LL	SPSDMA	-----	H	IK	SDT	L	IKH	SELKDR	
	rat	195	-----PAEEGYEN	LL	SPSDMA	-----	H	IK	SDT	L	IKH	SELKDR	
	chicken	185	-----STE	DI	HKV	INPSEEN	-----	P	KEEV	V	HNK	RELKEKL	
	zebrafish	168	-----STEII	HKV	WIS	LEG	-----	D	KENV	I	HQK	EDL	
	fruit fly	209	-----TVDT	DKH	EN	INT	ED	T	Y	Q	Q	ORM	
	mosquito	224	-----GGAAGQGSR	DD	DALL	NAVNDE	ED	H	DRY	N	EV	DR	
	flatworm	171	-----K	VPHEN	S	QHDI	ES	IG	-----	DNT	KKL	AAAN	
55	consensus	241	r ee	hen	visps	dl		ik	l	k	ht	el	kek

human	229	RSINQGLDRLRFVSHQGYSTEAEFEEPRVIDLWDLAQSAAELIDKELEA A REELKHFEAK
mouse	250	RSINQGLDRLRKVSHQGYGTTTEFEEPRVIDLWDLAQSAA-NFTKELES F REELKHFEAK
rat	229	RSINQGLDRLRKVSHQGYGPATEFEEPRVIDLWDLAQSAA-NFTKELES F REELKHFEAK
chicken	219	RSINQGFERLRLKVSHQGYDATSEFEEPRVIDLWLMKSA-NFTKELES F REELKHFEAK
5 zebrafish	201	PDLNQGFERLRLKITEGYTDDSEFREPRVI E LNEMAKRS I LSFDELD I KEELR H FFTK
fruit fly	261	TGIKDHYDRLERIVSS IPH Q-DHIEIKVQGLRVA AS -HFTVKELES I KEELH H FESR
mosquito	284	REIRDNEFDRLDRIASK QPK Q-D VEI KVQGLRVA LAS -DFSADEIA AL KEELH H Y ESR
flatworm	197	REI ND HLDEVHRKV T SEEF QP -FNEPRVKRLW KLA QENEKL T PHELSVI K DELSH F ESQ
consensus	301	rsinqgldrlrrvshqgy s teFeEPrVidLWdlAqsa nftekElesfreELkHfEak
10		
human	288	IEKH N HYQKQLEI N HEKLKH A FS----VGDGERV S SR E KKH A LEEG E TKELGY T VKKHL
mouse	309	IEKH N HYQKQLEI N HEKLKH A FS----IGIPEHTSRNKEKYV L LEEK T KELGY K VKKHL
rat	288	IEKH N HYQKQLEI N HEKLKH A FS----IGIPEHTSRNKEKYV L LEEK T KELGY K VKKHL
chicken	278	IEKH N HYQKQLEI N HEKLKH A FS----TGIKEH N RNREKYA N LEEK T KELGY K VKKHL
15 zebrafish	260	VEKH N HYQ E QLEI N HEKLKH A FS----IGIPEHTSRNKEKYNTLAEN N REGY N KKHL
fruit fly	319	LLKLRHILHA E HALQ N KE N Y K GEK-----VKDKSSRFEE M EDQLNKQTR A VE N MQ
mosquito	342	LLKLRHILHA E HALSLEKH K HS-----DAKADTHKL M EDN N INKQTR A VE N MQ
flatworm	255	KKKIEFH K VFFF V ANSCP N KGKNEEV S R I QEDAEERGKD K KSQV Y ENLELSIKHE N RKA
consensus	361	ieKhnh y qkqleishek l khve vgd ehv rnreky lleek t kelgy k vk k hl
20		
human	343	QDLSGRIS R --ARH N EL
mouse	364	QDLSSR M GR--ARH N EL
rat	343	QDLSSR M GR--ARH N EL
25 chicken	333	QDLSSR R ISOG-LOH N EL
zebrafish	315	QDL N K I SKNGLQH N EL
fruit fly	367	ENIEKTI F K----HTEL
mosquito	388	EEEVER R IFK----HSEL
flatworm	315	RKLEKY I EKIII H REL
30 consensus	421	qdls risr HnEL

Figure 15: Amino Acid Sequence Of Human RAP (SEQ ID NO:1)

TyrSerArgGluLysAsnGlnProLysProSerProLysArgGluSer
GlyGluGluPheArgMetGluLysLeuAsnGlnLeuTrpGluLysAla
GlnArgLeuHisLeuProProValArgLeuAlaGluLeuHisAlaAsp
LeuLysIleGlnGluArgAspGluLeuAlaTrpLysLysLeuLysLeu
AspGlyLeuAspGluAspGlyGluLysGluAlaArgLeuIleArgAsn
LeuAsnValIleLeuAlaLysTyrGlyLeuAspGlyLysLysAspAla
ArgGlnValThrSerAsnSerLeuSerGlyThrGlnGluAspGlyLeu
AspAspProArgLeuGluLysLeuTrpHisLysAlaLysThrSerGly
LysPheSerGlyGluGluLeuAspLysLeuTrpArgGluPheLeuHis
HisLysGluLysValHisGluTyrAsnValLeuLeuGluThrLeuSer
ArgThrGluGluIleHisGluAsnValIleSerProSerAspLeuSer
AspIleLysGlySerValLeuHisSerArgHisThrGluLeuLysGlu
LysLeuArgSerIleAsnGlnGlyLeuAspArgLeuArgArgValSer
HisGlnGlyTyrSerThrGluAlaGluPheGluGluProArgValIle
AspLeuTrpAspLeuAlaGlnSerAlaAsnLeuThrAspLysGluLeu
GluAlaPheArgGluGluLeuLysHisPheGluAlaLysIleGluLys
HisAsnHisTyrGlnLysGlnLeuGluIleAlaHisGluLysLeuArg
HisAlaGluSerValGlyAspGlyGluArgValSerArgSerArgGlu
LysHisAlaLeuLeuGluGlyArgThrLysGluLeuGlyTyrThrVal
LysLysHisLeuGlnAspLeuSerGlyArgIleSerArgAlaArgHis
AsnGluLeu

Figure 16: Amino Acid Sequence of the 28 kD RAP polypeptide (SEQ ID NO:2)

ProArgLeuGluLysLeuTrpHisLysAlaLysThrSerGlyLysPhe
SerGlyGluGluLeuAspLysLeuTrpArgGluPheLeuHisHisLys
GluLysValHisGluTyrAsnValLeuLeuGluThrLeuSerArgThr
GluGluIleHisGluAsnValIleSerProSerAspLeuSerAspIle
LysGlySerValLeuHisSerArgHisThrGluLeuLysGluLysLeu
ArgSerIleAsnGlnGlyLeuAspArgLeuArgArgValSerHisGln
GlyTyrSerThrGluAlaGluPheGluGluProArgValIleAspLeu
TrpAspLeuAlaGlnSerAlaAsnLeuThrAspLysGluLeuGluAla
PheArgGluGluLeuLysHisPheGluAlaLysIleGluLysHisAsn
HisTyrGlnLysGlnLeuGluIleAlaHisGluLysLeuArgHisAla
GluSerValGlyAspGlyGluArgValSerArgSerArgGluLysHis
AlaLeuLeuGluGlyArgThrLysGluLeuGlyTyrThrValLysLys
HisLeuGlnAspLeuSerGlyArgIleSerArgAlaArgHisAsnGlu
Leu